

FLORISTIC CHECKLIST FOR THE HEADWATERS  
BASIN AREA OF THE NORTH FORK OF THE  
AMERICAN RIVER, PLACER COUNTY, CALIFORNIA

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ABSTRACT

A species list of vascular plants was compiled for an 80 km<sup>2</sup> area, at elevations of 1770–2745 m, on the west slope of the central Sierra Nevada Mountains. The basin area is topographically and geologically diverse, and it supports a rich flora of more than 500 taxa. The area is relatively undisturbed and includes protected portions suitable for long-term research.

The headwaters of the North Fork of the American River, and of its tributary, Onion Creek, arise in an 80 km<sup>2</sup> basin in Placer County, centering on 39°15'N latitude and 120°20'W longitude. The basin is geologically and topographically diverse, with elevations ranging from 1770 m to 2745 m (Fig. 1). Slopes are typically 10–40%. Geological substrates include Mesozoic granitics of Jurassic or Triassic age, and Tertiary lavas (Burnett and Jennings 1962).

The basin contains two protected areas that have potential for long-term study. One is the Onion Creek Experimental Forest, about 13 km<sup>2</sup> in area, which is administered by the United States Forest Service's Pacific Southwest Forest and Range Experiment Station. This forest has been listed by The Institute of Ecology–UC Davis (1977, 1981) as an Experimental Ecological Reserve, one of 96 in the nation and 11 in California. These Reserves have been chosen on the basis of site quality, protection, stability, and depth of background information available. The National Science Foundation has begun a program to encourage long-term research in this network of Reserves. The other is the Chickering-American River, 7 km<sup>2</sup> in area, which recently has been added to the University of California's Natural Land and Water Reserve System, as well as the Institute of Ecology's system. The University encourages long-term studies on such properties.

Mr. Sherman Chickering has been compiling a flora for part of the basin for many years. From 1979 to 1982, the authors have been extending that work, collecting throughout the eastern and northern  $\frac{2}{3}$  of the basin, >1770 m, with particular attention to the two protected areas identified above.

GENERAL SITE DESCRIPTION

Although the span of elevation and microenvironment makes a climatic summary difficult, data from nearby weather stations allow one

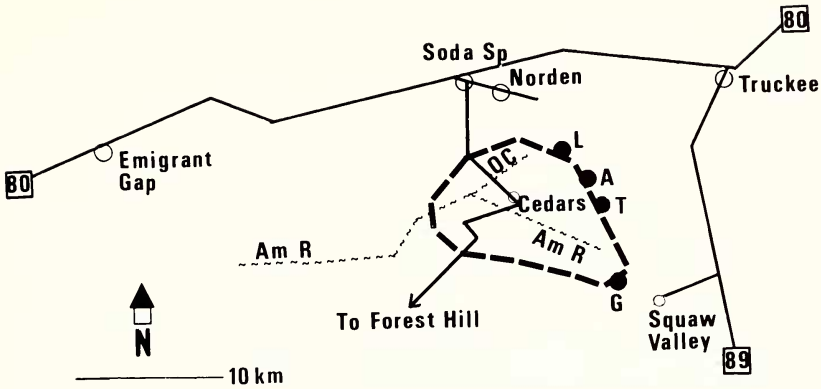


FIG. 1. Headwaters basin area of the North Fork of the American River (Am R) and of its tributary, Onion Creek (OC), as shown by dashed lines. The crest of the Sierra Nevada runs along the eastern edge of the basin, and major peaks are abbreviated: L for Mt. Lincoln (2555 m), A for Anderson Peak (2646 m), T for Tinkers Knob (2727 m), and G for Granite Chief (2745 m). The western edge of the basin corresponds to Heath Springs at an elevation of 1555 m, but for the purposes of the checklist we used a minimum elevation of 1770 m.

to make some climatic generalizations. The United States Forest Service currently maintains a Central Sierra Snow Laboratory at Soda Springs, 6 km north of the basin at an elevation of 2100 m. Using weather data from that station (Smith 1978a, b), from the National Climatic Center (Anonymous 1981), and from a review by Major (1977), we generalize as follows:

Mean annual precipitation is 129 cm, more than 90% of which falls from mid-October to early June; much of this falls as snow. Average snowpack duration is 192 days, and average snowpack depth is 310 cm. Half the years of record show two peak periods of precipitation—early December and mid-March—and half the years show a single peak in early January. Mean annual temperature is 5°C, mean daily maximum for July is 28°C, and mean daily minimum for January is -10°C.

Judging from the recent Forest Service draft of a third order soil survey of the basin (Sutter 1981) and published soil surveys of the adjacent Tahoe Basin (Rogers 1974), major soil series include: 1) Tinker and Tallac on glacial till; 2) Ahart, Meiss, and Waca on volcanics; and 3) Skeletal Granitic Rock Land types. Tinker and Tallac are Inceptisols, well-drained, brown loams, slightly acid (pH 6), 50–150 cm in depth. Meiss is an Inceptisol on slightly weathered volcanic rock, and is a pale brown, neutral sandy loam. Ahart and Waca are Inceptisols on weathered tuff, 59–100 cm in depth, and are brown, acidic, sandy loams. These volcanics are well- to excessively well-drained.

Major forest communities in the basin include white fir-mixed conifer forest, red fir forest, and lodgepole pine forest. Narrow riparian bands with *Populus trichocarpa*, *P. tremuloides*, *Alnus tenuifolia*, and *Salix* spp., or wet meadows dominate drier sites. The red fir and red fir-white fir forests have been quantitatively described for Onion Creek Experimental Forest by Talley (1977); all other communities are similar to those described for the Sierra as a whole by Rundel et al. (1977).

About half the area within the basin is part of Tahoe National Forest. About 25% of the area is held by private home owners who are seasonally present, their homes clustered in a central area called "The Cedars" (Fig. 1). About 10% of the area is in the University of California's Chickering-American River Reserve, and the remainder is owned by American Forest Products and the Southern Pacific Company.

Overall, the effects of human disturbance on the basin have been modest. Logging has occurred in two sections. Some jeep trails and weirs have been constructed in the Onion Creek Experimental Forest and a few other roads exist throughout the basin. Sheep began to graze in the basin in the 19th century, and they still graze in some sections in some years. The Cedars homesites have been present since the start of this century. Old photographs from that time show a more open, pine-dominated forest at 2000 m than the dense, fir-dominated forest at present. Visitors are attracted to the basin for recreational purposes by: 1) the Pacific Crest Trail, which skirts the southeastern portion of the basin; 2) by two unimproved campsites near Onion Creek that are occupied during deer hunting season; and 3) by a dirt road that runs through the basin, connecting Soda Springs to Forest Hill, about 45 km apart.

#### THE CHECKLIST

Families, genera, and species are listed as in Munz (1959). Nomenclature follows Munz (1959, 1968). The notation "chk" following a taxon means that a specimen is deposited only in the personal collection of Sherman Chickering. All other taxa have voucher specimens deposited with the herbarium of the Botany Department at the University of California, Davis (DAV). After each listed taxon found above 2050 m we have noted floristic affinities according to Stebbins (1982): "1" represents circumboreal, "2" for Lowland California, "3" for Great Basin Desert, and "4" for Old Cordilleran element. We found that 359 out of our complete list of 547 taxa could be associated this way. Of these 359 taxa, 83 (23%) have circumboreal affinities, 91 (26%) Lowland California, 42 (12%) Great Basin, and 142 (39%) Old Cordilleran affinities. This is roughly comparable to the proportions from the whole Sierra Nevada flora cited by Stebbins, except that the Lowland California element is better represented, and the Great Basin Desert less so (OC = 39%, CB = 26%, LC = 19%, GB = 16%) (Stebbins 1982).

Nine species of rare and endangered plants have been determined as potentially occurring within the basin, according to California Natural Diversity Data Base maps: *Berberis sonnei*, *Elodea brandegeae*, *Erigeron umbellatum* var. *torreyana*, *Glyceria grandis*, *Lewisia pygmaea* subsp. *longipetala*, *Rorippa subumbellata*, *Silene invisa*, *Veronica cusickii*, and *Viola tomentosa*. However, only one of these, *Veronica cusickii*, has been collected in the basin in recent years. Its status is listed as rare in California but common elsewhere. We have not yet found any other of the nine species, but it is possible, given the high plant diversity in the Headwaters Basin, that further searches may result in discovery of new populations.

We have no doubt that the checklist is incomplete, and that additional taxa will be found by others in the future. Nevertheless, we believe that the great majority of all taxa are recorded in this list. A total of 61 families of vascular plants are found—one-third of all families in California—with 240 genera and 547 taxa of specific or sub-specific rank. Table 1 lists the 13 largest families and the 17 largest genera. The nine largest families accounted for more than half of all taxa, and the 18 largest genera accounted for over one-fourth of all taxa. Considering that there are about 5000 taxa in the entire state of California (Raven 1977), an area of about 40,500,000 ha, we can conclude that this 8000 ha basin is exceptionally rich. This richness is paralleled by the basin's animal diversity. More than 100 species of birds have been observed in this area (Beedy 1981), and preliminary observations indicate a high diversity of reptiles, amphibians, and insects (Barry, Daley, and Shapiro, pers. comm.).

#### LYCOPHYTA

##### Selaginellaceae

*Selaginella watsoni* 4.

#### SPHENOPHYTA

##### Equisetaceae

*Equisetum arvense*.

*Equisetum funstoni*.

#### PTEROPHYTA

##### Pteridaceae

*Athyrium alpestre* var. *americanum* 1 chk.

*Pellaea brachyptera*.

*Pellaea breweri* 4 chk.

*Cheilanthes gracillima* 3.

*Pellaea bridgesii*.

*Cryptogramma acrostichoides* 1.

*Pteridium aquilinum* var. *pubescens* 1.

*Onychium densum* 4 chk.

##### Aspidiaceae

*Cystopteris fragilis* 1.

TABLE 1. THE 13 LARGEST FAMILIES AND THE 17 LARGEST GENERA OF THE VASCULAR PLANT FLORA OF THE HEADWATERS BASIN AREA.

Families with 12 or more taxa		Genera with more than 5 taxa	
Family	Taxa	Genus	Taxa
Asteraceae	81	<i>Carex</i>	14
Poaceae	39	<i>Eriogonum</i>	12
Scrophulariaceae	38	<i>Viola</i>	11
Polygonaceae	28	<i>Arabis</i>	11
Brassicaceae	25	<i>Epilobium</i>	10
Fabaceae	24	<i>Polygonum</i>	10
Polemoniaceae	22	<i>Penstemon</i>	9
Cyperaceae	21	<i>Lupinus</i>	8
Rosaceae	20	<i>Minulus</i>	8
Saxifragaceae	20	<i>Ribes</i>	8
Onagraceae	17	<i>Arnica</i>	8
Ranunculaceae	15	<i>Trifolium</i>	7
Apiaceae	12	<i>Poa</i>	7
		<i>Artemisia</i>	6
		<i>Potentilla</i>	6
		<i>Allium</i>	6
		<i>Ranunculus</i>	6

Total taxa for the Headwaters Basin: 540.

Total genera for the Headwaters Basin: 241.

Total families for the Headwaters Basin: 62.

## CONIFEROPHYTA

### Pinaceae

<i>Abies concolor.</i>	<i>Pinus monticola</i> 1.
<i>Abies magnifica</i> 4.	<i>Pinus murrayana</i> 4.
<i>Pinus albicaulis</i> 4.	<i>Pseudotsuga menziesii.</i>
<i>Pinus jeffreyi</i> 4.	<i>Tsuga mertensiana</i> 4.
<i>Pinus lambertiana.</i>	

### Cupressaceae

<i>Calocedrus decurrens.</i>	<i>Juniperus occidentalis</i> 3.
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## ANTHOPHYTA—MONOCOTYLEDONEAE

### Amaryllidaceae

<i>Allium amplexans.</i>	<i>Allium tribracteatum</i> 3.
<i>Allium campanulatum</i> 2.	<i>Brodiaea elegans.</i>
<i>Allium obtusum</i> 2.	<i>Brodiaea hyacinthina</i> 2.
<i>Allium parvum</i> chk.	<i>Brodiaea lutea</i> var. <i>analina</i> 2.
<i>Allium platycaule.</i>	

## Cyperaceae

- |                              |                                 |
|------------------------------|---------------------------------|
| <i>Carex athrostachya</i> 4. | <i>Carex nigricans</i> 1.       |
| <i>Carex aquatilis</i> 1.    | <i>Carex raynoldsii</i> 1.      |
| <i>Carex exserta</i> 4.      | <i>Carex rossii</i> 4.          |
| <i>Carex heteroneura</i> 1.  | <i>Carex scopulorum</i> 1.      |
| <i>Carex jonesii</i> 4.      | <i>Carex stramineiformis</i> 4. |
| <i>Carex multicosata</i> 4.  | <i>Carex vernacula</i> 1.       |
| <i>Carex nervina</i> 4.      | <i>Scirpus congdoni</i> 1.      |

## Iridaceae

- |                                  |                                      |
|----------------------------------|--------------------------------------|
| <i>Iris missouriensis</i> 2 chk. | <i>Sisyrinchium idahoense</i> 3 chk. |
|----------------------------------|--------------------------------------|

## Juncaceae

- |                                 |                                  |
|---------------------------------|----------------------------------|
| <i>Juncus chlorocephalus</i> 4. | <i>Juncus orthophyllus</i> 2.    |
| <i>Juncus drummondii</i> 4.     | <i>Juncus parryi</i> 4.          |
| <i>Juncus mexicanus</i> 4.      | <i>Luzula subcongesta</i> 1 chk. |

## Liliaceae

- |  |  |
|--|--|
| <i>Calochortus leichtlinii</i> 2.      | <i>Lilium washingtonianum</i> .                        |
| <i>Chlorogalum pomeridianum</i> .      | <i>Smilacina racemosa</i> var. <i>amplexicaulis</i> 4. |
| <i>Fritillaria atropurpurea</i> 2 chk. | <i>Smilacina stellata</i> 1.                           |
| <i>Fritillaria recurva</i> chk.        | <i>Veratrum californicum</i> 1.                        |
| <i>Lilium parvum</i> 2.                | <i>Zigadenus venosus</i> 4.                            |
| <i>Lilium pardalinum</i> chk.          |  |

## Orchidaceae

- |   |  |
|---|--|
| <i>Corallorhiza maculata</i> 4.                       | <i>Habenaria sparsiflora</i> 1.        |
| <i>Corallorhiza striata</i> .                         | <i>Habenaria unalascensis</i> 1.       |
| <i>Goodyera oblongifolia</i> .                        | <i>Spiranthes romanzoffiana</i> 1 chk. |
| <i>Habenaria dilatata</i> var. <i>leucostachys</i> 1. |  |

## Poaceae

- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| <i>Agropyron trachycaulum</i> 4.    | <i>Deschampsia elongata</i> .     |
| <i>Agrostis scabra</i> 4.           | <i>Elymus glaucus</i> 4.          |
| <i>Agrostis variabilis</i> 4.       | <i>Glyceria elata</i> 4.          |
| <i>Bromus marginatus</i> 2.         | <i>Glyceria striata</i> 4.        |
| <i>Bromus orcuttianus</i> .         | <i>Hordeum brachyantherum</i> 1.  |
| <i>Bromus suksdorfii</i> 2.         | <i>Hordeum californicum</i> .     |
| <i>Bromus tectorum</i> .            | <i>Lolium perenne</i> .           |
| <i>Calamagrostis canadensis</i> 1.  | <i>Melica stricta</i> 4.          |
| <i>Dactylis glomerata</i> .         | <i>Muhlenbergia filiformis</i> 4. |
| <i>Danthonia californica</i> 2.     | <i>Panicum pacificum</i> .        |
| <i>Danthonia unispicata</i> .       | <i>Phleum alpinum</i> 1.          |
| <i>Deschampsia danthonioides</i> 2. | <i>Poa ampla</i> .                |

<i>Poa bolanderi</i> 2.	<i>Stipa columbiana</i> 3.
<i>Poa epilis</i> 4.	<i>Stipa lemmonii</i> .
<i>Poa fendleriana</i> 4.	<i>Stipa occidentalis</i> 3.
<i>Poa incurva</i> 4.	<i>Stipa williamsii</i> .
<i>Poa palustris</i> .	<i>Trisetum cernuum</i> var. <i>canescens</i>
<i>Poa pratense</i> 1.	1.
<i>Sitanion hystrix</i> 4.	<i>Trisetum spicatum</i> 1.
<i>Stipa californica</i> 3.	<i>Triticum aestivum</i> .

## ANTHOPHYTA—DICOTYLEDONEAE

## Aceraceae

*Acer glabrum* 1.

## Apiaceae

<i>Angelica breweri</i> 1.	<i>Perideridia parishii</i> 2.
<i>Cicuta douglasii</i> 1.	<i>Pteryxia terebinthina</i> var. <i>cali-</i>
<i>Heracleum lanatum</i> 1.	<i>fornica</i> 3.
<i>Ligusticum grayi</i> 1.	<i>Sanicula graveolens</i> 2.
<i>Lomatium dissectum</i> chk.	<i>Sanicula tuberosa</i> 2.
<i>Osmorhiza chilensis</i> 2.	<i>Sphenosciadium capitellatum</i> 2.
<i>Perideridia bolanderi</i> 2.	

## Apocynaceae

*Apocynum androsaemifolia* 4 chk. *Apocynum pumilum*.

## Asclepiadaceae

*Asclepias cordifolia* chk.

## Asteraceae

<i>Achillea lanulosa</i> 1.	<i>Arnica discoidea</i> var. <i>alata</i> .
<i>Adenocaulon bicolor</i> .	<i>Arnica longifolia</i> 4 chk.
<i>Agoseris glauca</i> var. <i>laciniata</i> 4	<i>Arnica mollis</i> 4 chk.
chk.	<i>Arnica nevadensis</i> 4 chk.
<i>Agoseris glauca</i> var. <i>monticola</i> 4	<i>Arnica parryi</i> subsp. <i>sonnei</i> 4.
chk.	<i>Artemisia arbuscula</i> 3.
<i>Agoseris grandiflora</i> chk.	<i>Artemisia cana</i> 3 chk.
<i>Agoseris retrorsa</i> .	<i>Artemisia douglasiana</i> .
<i>Anaphalis margaritacea</i> 1.	<i>Artemisia ludoviciana</i> 3.
<i>Antennaria alpina</i> var. <i>media</i> 4	<i>Artemisia rothrockii</i> 3.
chk.	<i>Artemisia tridentata</i> 3.
<i>Antennaria rosea</i> 4.	<i>Aster alpigenus</i> subsp. <i>andersonii</i>
<i>Antennaria umbrinella</i> chk.	4 chk.
<i>Arnica amplexicaulis</i> 4 chk.	<i>Aster ascendens</i> chk.
<i>Arnica chamissonis</i> .	<i>Aster integrifolius</i> 4 chk.
<i>Arnica cordifolia</i> 4 chk.	<i>Aster occidentalis</i> 4.

- Aster radulinus* chk.  
*Balsamorhiza sagittata* 4.  
*Brickellia grandiflora* 3 chk.  
*Brickellia greenei*.  
*Chaenactis douglasii* 4.  
*Chaenactis nevadensis* 4 chk.  
*Chrysopsis breweri* 4.  
*Chrysopsis villosa* var. *hispida*.  
*Chrysothamnus nauseosus* 3.
- Circium andersonii* 3.  
*Circium californicum* chk.  
*Circium vulgare*.  
*Crepis acuminata* 4 chk.  
*Crepis modocensis* 4 chk.  
*Crepis occidentalis* subsp. *conjuncta* 4 chk.  
*Erigeron coulteri* 4 chk.  
*Erigeron peregrinus* subsp. *calilianthemus* 4.  
*Erigeron barbellulatus* 4 chk.  
*Erigeron philadelphicus*.  
*Eriophyllum lanatum* 2.  
*Eupatorium occidentale* 4.  
*Gnaphalium californicum*.  
*Gnaphalium palustre* 2.  
*Haplopappus acaulis* 3 chk.  
*Haplopappus bloomeri* 4 chk.  
*Haplopappus suffruticosus* 4 chk.
- Helianthella californica* var. *nevadensis*.  
*Hieracium albiflorum* 4.  
*Hieracium gracile* 4.  
*Hieracium horridum* chk.  
*Lagophylla ramosissima*.  
*Machaeranthera canescens* 3 chk.  
*Machaeranthera shastensis* var. *glossophylla* chk.  
*Madia elegans* 2.  
*Madia glomerata* chk.  
*Madia gracilis* chk.  
*Madia minima* 2.  
*Microseris nutans* 4.  
*Nothocalais alpestris* 4 chk.  
*Raillardella argentea* 4 chk.  
*Senecio canus* 4 chk.  
*Senecio integerrimus* var. *major* 4.  
*Senecio triangularis* 4.  
*Solidago californica* 1.  
*Solidago canadensis* subsp. *elongata* 1 chk.  
*Solidago multiradiata* chk.  
*Stephanomeria lactucina* 3.  
*Taraxacum laevigatum*.  
*Taraxacum officinale*.  
*Tragopogon dubius*.  
*Whitneya dealbata*.  
*Wyethia mollis* 2.

## Brassicaceae

- Arabis breweri*.  
*Arabis divaricarpa* chk.  
*Arabis drummondii* chk.  
*Arabis hirsuta*.  
*Arabis holboellii* var. *pendulocarpa*.  
*Arabis holboellii* var. *retrofracta* 4.  
*Arabis lemmonii* chk.  
*Arabis lyallii* 4.  
*Arabis platysperma* 4.  
*Arabis puberula* chk.  
*Arabis rectissima* chk.  
*Athysanus pusillus* chk.  
*Barbarea orthoceras*.
- Cardamine breweri* 4.  
*Cardamine lyallii*.  
*Descurainia richardsonii* 3.  
*Draba densifolia* 4 chk.  
*Erysimum capitatum*.  
*Erysimum perenne* 2 chk.  
*Lepidium densiflorum*.  
*Lepidium virginicum* var. *pubescens*.  
*Lesquerella occidentalis* chk.  
*Phoenicaulis cheiranthoides* 3.  
*Streptanthus tortuosus* 3.  
*Thysanocarpus curvipes*.



## Betulaceae

*Alnus tenuifolia* 1.

## Boraginaceae

<i>Cryptantha nubigena</i> 3.	<i>Hackelia longituba</i> 4.
<i>Cryptantha simulans</i> .	<i>Hackelia nervosa</i> chk.
<i>Cryptantha torreyana</i> 2.	<i>Plagiobothrys cognatus</i> .
<i>Hackelia jessicae</i> 4.	<i>Plagiobothrys hispidulus</i> 2.

## Caprifoliaceae

<i>Lonicera conjugalis</i> 1.	<i>Symphoricarpos acutus</i> 2.
<i>Sambucus caerulea</i> 1.	<i>Symphoricarpos parishii</i> 4.
<i>Sambucus microbotrys</i> 1 chk.	<i>Symphoricarpos vaccinoides</i> 4.

## Caryophyllaceae

<i>Arenaria douglasii</i> chk.	<i>Silene douglasii</i> 2.
<i>Arenaria kingii</i> var. <i>glabrescens</i> 4.	<i>Silene menziesii</i> 4.
<i>Arenaria nuttallii</i> subsp. <i>gracilis</i> 4 chk.	<i>Silene montana</i> .
<i>Arenaria pumicola</i> var. <i>californica</i> 4 chk.	<i>Spergularia rubra</i> .
	<i>Stellaria longipes</i> 1.

## Chenopodiaceae

<i>Chenopodium atrovirens</i> 3.	<i>Chenopodium incognitum</i> 3.
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## Convolvulaceae

*Convolvulus malacophyllus* chk.

## Cornaceae

<i>Cornus occidentalis</i> × <i>C. californica</i> 1.	<i>Cornus stolonifera</i> 1.
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## Crassulaceae

<i>Sedum lanceolatum</i> 4.	<i>Sedum rosea</i> subsp. <i>integrifolium</i> .
<i>Sedum obtusatum</i> 4.	

## Cuscutaceae

*Cuscuta californica* 2.

## Ericaceae

<i>Arctostaphylos nevadensis</i> 2.	<i>Ledum glandulosa</i> 1 chk.
<i>Arctostaphylos patula</i> 2.	<i>Leucothoe davisiae</i> 4.
<i>Cassiope mertensiana</i> 1.	<i>Phyllodoce breweri</i> 1.
<i>Kalmia polifolia</i> var. <i>microphylla</i> 1.	

## Euphorbiaceae

*Euphorbia serpyllifolia*

## Fabaceae

*Astragalus austinae* chk.*Astragalus whitneyi* 3.*Lotus crassifolius* 2.*Lotus nevadensis* 2.*Lotus oblongifolius* 2.*Lotus pinnatus* chk.*Lotus purshianus* 2.*Lupinus albicaulis* 2.*Lupinus andersonii* var. *apertus*  
2.*Lupinus arbustus* subsp. *silvicola*  
4 chk.*Lupinus caudatus* 3.*Lupinus latifolius* chk.*Lupinus lyallii* 4 chk.*Lupinus meionanthus* 4 chk.*Lupinus polyphyllus* subsp. *superbus* 2.*Medicago lupulina* chk.*Medicago sativa*.*Trifolium cyathiferum* 2.*Trifolium longipes* 4.*Trifolium microcephalum* 2.*Trifolium monanthum* var. *parvum* 2.*Trifolium pratense* chk.*Trifolium productum* 4.*Trifolium repens* chk.

## Fagaceae

*Chrysolepis sempervirens* 2.*Quercus chrysolepis* var. *nana* ×  
*Q. vaccinifolia*.*Quercus kelloggii*.*Quercus vaccinifolia* 2.

## Fumariaceae

*Dicentra uniflora* 4.

## Hydrophyllaceae

*Draperia systyla*.*Hesperochiron pumilus* 3 chk.*Hydrophyllum capitatum* var. *alpinum*.*Hydrophyllum occidentale* 3.*Nama lobbii*.*Nemophila spatulata* 2.*Phacelia frigida* subsp. *dasyphyl-  
la* chk.*Phacelia hydrophylloides* 2 chk.*Phacelia marcescens*.*Phacelia mutabilis* 2.*Phacelia ramosissima*.

## Hypericaceae

*Hypericum anagalloides* 2.

## Lamiaceae

*Agastache urticifolia* 2.*Monardella odoratissima* subsp.  
*glauca* 2.*Monardella odoratissima* subsp.  
*pallida* chk.*Prunella vulgaris* subsp. *lanceo-  
lata* chk.*Scutellaria californica*.*Stachys rigida* 2 chk.*Trichostema oblongum*.

## Linaceae

*Linum perenne* subsp. *lewisii*.

## Loasaceae

*Mentzelia dispersa* chk.

## Loranthaceae

*Arceuthobium douglasii*.

## Malvaceae

*Sidalcea glaucescens* 2 chk.

*Sidalcea oregana*.

*Sidalcea oregana* subsp. *spicata*

2.

## Onagraceae

*Boisduvalia densiflora* 2 chk.

*Circaea alpina* var. *pacifica*.

*Epilobium adenocaulon* 4.

*Epilobium angustifolium* 4.

*Epilobium brevistylum* chk.

*Epilobium glaberrimum* 4 chk.

*Epilobium glandulosum* chk.

*Epilobium hornemannii* chk.

*Epilobium obcordatum* 4.

*Epilobium oregonense* 4.

*Epilobium paniculatum*.

*Epilobium pringleanum* 4.

*Gayophytum diffusum* 4.

*Gayophytum humile* 4.

*Gayophytum nuttallii* chk.

*Zauschneria californica* subsp. *latifolia* 2.

## Orobanchaceae

*Orobanche californica* var. *cor-*  
*ymbosa* chk.

*Orobanche fasciculata* chk.

*Orobanche grayana*.

*Orobanche uniflora* var. *purpurea*  
chk.

*Orobanche uniflora* var. *sedi* chk.

## Paeoniaceae

*Paeonia brownii* 4.

## Plantaginaceae

*Plantago lanceolata*.

*Plantago major*.

## Polemoniaceae

*Allophyllum integrifolium* 2.

*Allophyllum violaceum* chk.

*Collomia grandiflora* 2.

*Collomia linearis* 2 chk.

*Collomia tinctoria* 2.

*Gilia capillaris* 2.

*Gilia leptalea* 2.

*Gilia leptalea* subsp. *bicolor*.

*Ipomopsis aggregata* chk.

*Ipomopsis aggregata* subsp. *atten-*  
*uata* 4 chk.

*Ipomopsis congesta* subsp. *mon-*  
*tana* 4 chk.

*Leptodactylon pungens* subsp.  
*pulchriflorum* 2.

*Linanthus ciliatus* 2.

*Linanthus montanus*.

*Navarretia breweri* 2.  
*Navarretia divaricata* 2.  
*Navarretia minima*.  
*Navarretia propinqua*.

*Phlox diffusa* 3.  
*Phlox gracillis* chk.  
*Polemonium californicum* 4.  
*Polemonium pulcherrimum* 4 chk.

#### Polygonaceae

*Eriogonum incanum*.  
*Eriogonum lobbii* 4.  
*Eriogonum marifolium* chk.  
*Eriogonum nudum* 2.  
*Eriogonum nudum* var. *deductum*.  
*Eriogonum ovalifolium* subsp. *vineum* 3 chk.  
*Eriogonum rosense* chk.  
*Eriogonum spergulinum* var. *red-dingianum* 2.  
*Eriogonum umbellatum* subsp. *covillei* 4.  
*Eriogonum umbellatum* var. *umbellatum* 4.  
*Eriogonum ursinum* chk.  
*Eriogonum wrightii* subsp. *subscaposum* 3.

*Oxyria digyna* chk.  
*Polygonum bistortoides* chk.  
*Polygonum davisiae* 1.  
*Polygonum douglasii* 1.  
*Polygonum douglasii* var. *johnstonii* chk.  
*Polygonum kelloggii* 4.  
*Polygonum lapathifolium*.  
*Polygonum minimum* 4.  
*Polygonum phytolaccaefolium* 1.  
*Polygonum shastense* 1.  
*Polygonum spergulariaeforme* chk.  
*Rumex acetosella* chk.  
*Rumex angiocarpus*.  
*Rumex crispus* chk.  
*Rumex paucifolius* 1.  
*Rumex triangulivalvis*.

#### Portulacaceae

*Calyptridium umbellatum*.  
*Claytonia lanceolata* 4 chk.  
*Lewisia nevadensis* 4.  
*Lewisia triphylla* 4.

*Montia chamissoi* 4 chk.  
*Montia parvifolia* 4 chk.  
*Montia perfoliata*.  
*Montia perfoliata* var. *depressa*.

#### Primulaceae

*Dodecatheon alpinum* subsp. *majus* 4.

*Dodecatheon jeffreyi* 4 chk.

#### Pyrolaceae

*Allotropa virgata* chk.  
*Chimaphila menziesii*.  
*Pleuricospora fimbriolata* 2.  
*Pterospora andromedea* 4.

*Pyrola asarifolia* var. *purpurea* 1 chk.  
*Pyrola picta* 1.  
*Sarcodes sanguinea* 4.

#### Ranunculaceae

*Aconitum columbianum* 1.  
*Anemone drummondii* 4 chk.  
*Anemone occidentalis* 1 chk.  
*Aquilegia formosa* 4.  
*Caltha howellii* 1.  
*Delphinium depauperatum* 2.

*Delphinium sonnei*.  
*Ranunculus alismaefolius* var. *alismellus* 4 chk.  
*Ranunculus alismaefolius* var. *hartwegii* chk.  
*Ranunculus cymbalaria* chk.

*Ranunculus eschscholtzia* 4 chk.     *Ranunculus uncinatus*.  
*Ranunculus occidentalis* var. *ul-*     *Thalictrum fendleri* 1.  
     *tramontanus* 2.

## Rhamnaceae

*Ceanothus cordulatus* 2.     *Ceanothus prostratus* chk.  
*Ceanothus fresnensis* × chk.     *Ceanothus velutinus*.  
*Ceanothus integerrimus*.

## Rosaceae

*Amelanchier pallida* 1.     *Potentilla glandulosa* subsp. *glandulosa* chk.  
*Fragaria californica* chk.     *Potentilla glandulosa* subsp. *nevadensis*.  
*Geum canescens* 4.     *Potentilla gracilis*.  
*Holodiscus boursieri* 4.     *Prunus emarginata* 1.  
*Horkelia fusca* subsp. *parviflora* 2.     *Purshia tridentata* 3.  
*Horkelia fusca* subsp. *pseudocapitata* 2 chk.     *Rubus parviflorus* 4.  
*Ivesia shockleyi* 3.     *Sibbaldia procumbens* 1 chk.  
*Potentilla breweri* 1.     *Sorbus californica* 1 chk.  
*Potentilla flabellifolia* 1 chk.     *Spiraea densiflora* 1.  
*Potentilla fruticosa* 1.

## Rubiaceae

*Galium aparine*.     *Galium trifidum* var. *pusillum*.  
*Galium bifolium* 4.     *Galium triflorum*.  
*Galium grayanum*.     *Kelloggia galioides* 4.  
*Galium hypotrichium* chk.

## Salicaceae

*Populus tremuloides* 1.     *Salix lemmonii* 1.  
*Populus trichocarpa* 1.     *Salix orestera* 1.  
*Salix eastwoodiae* 1.     *Salix scouleriana* 1.  
*Salix jepsonii* 1.

## Saxifragaceae

*Heuchera micrantha* var. *erubescens*.     *Parnassia fimbriata* chk.  
*Heuchera rubescens* var. *glaucescens* chk.     *Parnassia palustris* 1 chk.  
*Lithophragma bulbifera* chk.     *Ribes cereum*.  
*Lithophragma glabrum* 2.     *Ribes inebrians* 4.  
*Lithophragma parviflora*.     *Ribes lasianthum* 2.  
*Mitella breweri* 1.     *Ribes montigenum* 4 chk.  
         *Ribes nevadense* 2 chk.  
         *Ribes roezlii* 2.

- |  |                                    |
|--|------------------------------------|
| <i>Ribes viscosissimum</i> 4.                  | <i>Saxifraga bryophora</i> 1.      |
| <i>Ribes viscosissimum</i> var. <i>halli</i> . | <i>Saxifraga nidifica</i> 2.       |
| <i>Saxifraga aprica</i> 2.                     | <i>Saxifraga odontoloma</i> 1 chk. |

## Scrophulariaceae

- |   |  |
|---|--|
| <i>Castilleja applegatei</i> 2.                                   | <i>Orthocarpus copelandii</i> var. <i>cryp-</i><br><i>tanthus</i> 3. |
| <i>Castilleja miniata</i> 4.                                      | <i>Orthocarpus hispidus</i> 2.                                       |
| <i>Castilleja nana</i> 3.   | <i>Pedicularis attolens</i> 1.                                       |
| <i>Castilleja piersonii</i> chk.                                  | <i>Pedicularis groenlandica</i> 1.                                   |
| <i>Castilleja pilosa</i> 3.                                       | <i>Pedicularis semibarbata</i> 1.                                    |
| <i>Castilleja pruinosa</i> 3.                                     | <i>Penstemon deustus</i> 4.  |
| <i>Collinsia parviflora</i> 2.                                    | <i>Penstemon gracilentus</i> .                                       |
| <i>Collinsia torreyi</i> var. <i>torreyi</i> chk.                 | <i>Penstemon heterodoxus</i> 4 chk.                                  |
| <i>Collinsia torreyi</i> var. <i>wrightii</i> 2.                  | <i>Penstemon laetus</i> .  |
| <i>Cordylanthus pilosus</i> subsp. <i>bo-</i><br><i>landeri</i> . | <i>Penstemon laetus</i> subsp. <i>roezlii</i> 2<br>chk.              |
| <i>Cordylanthus tenuis</i> .                                      | <i>Penstemon lemmonii</i> .  |
| <i>Mimulus breweri</i> 3.   | <i>Penstemon newberryi</i> 4.  |
| <i>Mimulus cardinalis</i> .                                       | <i>Penstemon oreocharis</i> 2.                                       |
| <i>Mimulus guttatus</i> 2.  | <i>Penstemon speciosus</i> 3 chk.                                    |
| <i>Mimulus lewisii</i> 4.   | <i>Scrophularia californica</i> .                                    |
| <i>Mimulus microphyllus</i> chk.                                  | <i>Verbascum thapsus</i> .   |
| <i>Mimulus moschatus</i> 4.                                       | <i>Veronica cusickii</i> 1 chk.                                      |
| <i>Mimulus primuloides</i> 4.                                     | <i>Veronica serpyllifolia</i> var. <i>humi-</i><br><i>fusa</i> 1.    |
| <i>Mimulus tilingii</i> 2.  |  |
| <i>Mimulus torreyi</i> 2.   |  |

## Solanaceae

- Solanum xantii* var. *montanum* chk.

## Urticaceae

- Urtica holosericea*.

## Valerianaceae

- Valeriana capitata* subsp. *capitata* 1 chk.

## Verbenaceae

- |                             |                              |
|-----------------------------|------------------------------|
| <i>Verbena hastata</i> chk. | <i>Verbena officinalis</i> . |
|-----------------------------|------------------------------|

## Violaceae

- |                          |                                |
|--------------------------|--------------------------------|
| <i>Viola adunca</i> chk. | <i>Viola beckwithii</i> 3 chk. |
| <i>Viola bakeri</i> 4.   | <i>Viola glabella</i> 2.       |

<i>Viola lobata</i> chk.	<i>Viola purpurea</i> subsp. <i>mesophyta</i> .
<i>Viola macloskeyi</i> 1.	
<i>Viola purpurea</i> 2.	<i>Viola purpurea</i> subsp. <i>xerophyta</i> .
<i>Viola purpurea</i> subsp. <i>integrifolia</i> .	<i>Viola sheltonii</i> .

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## LITERATURE CITED

- ANONYMOUS. 1981. Climatological data, annual summary, 1980, California. NOAA/EDIS National Climatic Center, Asheville, NC.
- BEDDY, E. C. 1981. Bird communities and forest structure in the Sierra Nevada of California. *Condor* 83:97-105.
- BURNETT, J. L. and C. W. JENNINGS. 1962. Geologic map of California: Chico sheet. California Division of Mines and Geology, Sacramento.
- MAJOR, J. 1977. California climate in relation to vegetation. In M. G. Barbour and J. Major, eds., *Terrestrial vegetation of California*, pp. 11-74. Wiley-Interscience, NY.
- MUNZ, P. A. 1973. *A California flora*. University of California Press, Berkeley.
- ROGERS, J. H. 1974. Soil survey of the Tahoe Basin area, California and Nevada. USDA/Soil Conservation Service, Washington, D.C.
- RAVEN, P. H. 1977. The California flora. In M. G. Barbour and J. Major, eds., *Terrestrial vegetation of California*, pp. 109-138. Wiley-Interscience, NY.
- RUNDELL, P. W., D. J. PARSONS, and D. T. GORDON. 1977. Montane and subalpine vegetation of the Sierra Nevada and Cascade Ranges. In M. G. Barbour and J. Major, eds., *Terrestrial vegetation of California*, pp. 559-599. Wiley-Interscience, NY.
- SMITH, J. L. 1978a. Snowpack characteristics and the simulated effects of weather modification upon them. Central Sierra Snow Laboratory, USFS/PSW Forest and Range Experiment Station, Berkeley.
- . 1978b. Historical climatic regime and the projected impact of weather modification upon precipitation and temperature at the Central Sierra Snow Laboratory. USFS/PSW Forest and Range Experiment Station, Berkeley.
- STEBBINS, L. 1982. Floristic affinities of the High Sierra, Nevada. *Madroño* 29:189-199.
- SUTTER, F. 1981. Draft, Tahoe Soil Resource Inventory. USFS/Tahoe National Forest, Nevada City, CA. Map + descriptive legend.
- TALLEY, S. N. 1977. An ecological survey of the Onion Creek candidate research natural area in the Tahoe National Forest, California. USFS/PSW Forest and Range Experiment Station, Item 1, Order No. 896-PSW-75, Berkeley.
- THE INSTITUTE OF ECOLOGY. 1977. Experimental ecological reserves. Grant No. BMS-74-20599 A01, The Biological Research Resource Program of the National Science Foundation. U.S. Government Printing Office, Washington, D.C.
- . 1981. Experimental ecological reserves: final report on a national network. Grant No. DEB-7912368, The Biological Research Resource Program of the National Science Foundation. Unpubl. mimeo.